R.2 Exercise Set

Soal 1

$$\left[\frac{(24a^{10}b^{-8}c^7)}{(12a^6b^{-3}c^5)}\right]^{-5}$$

```
>$& expand ((24*a^10*b^-8*c^7)/(12*a^6*b^-3*c^5))^-5
```

$$\frac{b^{25}}{32\,a^{20}\,c^{10}}$$

Soal 2

$$\left[\frac{(125p^{12}q^{-14}r^{22})}{(25p^8q^6r^{-15})}\right]^{-4}$$

```
>$& expand (125*p^12*q^-14*r^22)/(25*p^8*q^6*r^-15)^-4
```

$$\frac{48828125\,p^{44}\,q^{10}}{r^{38}}$$

Soal 3

$$\frac{4(8-6)^2 - 4*3 + 2*8}{3^1 + 19^0}$$

>$& factor (4*(8-6)^2-4*3+2*8)/(3^1+19^0)

5

Saol 4

$$\frac{[4(8-6)^2 + 4](3 - 2*8)}{2^2(2^3 + 5)}$$

>$& factor (4*(8-6)^2+4*(3-2*8))/(2^2*(2^3+5))

$$-\frac{9}{13}$$

Soal 5

$$(m^{x-b} * n^{x+b})^x (m^b * n^{-b})^x$$

```
>$& showev ('expand ((m^x-b*n^x+b)^x*(m^b*n^-b)^x))
```

$$expand\left(\left(\frac{m^b}{n^b}\right)^x (-b\,n^x + m^x + b)^x\right) = \left(\frac{m^b}{n^b}\right)^x (-b\,n^x + m^x + b)^x$$

Soal 1

$$(3a^2)(-7a^4)$$

```
>$& showev (expand((3*a^2)*(-7*a^4)))
```

$$-21\,a^6 = -21\,a^6$$

Soal 2

$$(6xy^3)(9x^4y^2)$$

```
>$& showev (expand (6*x*y^3)*(9*x^4*y^2))
```

$$54\,x^5\,y^5 = 54\,x^5\,y^5$$

Soal 3

$$(8y^5)(9y)$$

```
>$& showev (expand(8*y^5)*(9*y))
```

$$72\,y^6 = 72\,y^6$$

Soal 4

$$(x+3)^2$$

```
>$& (expand ((x+3)^2))
```

$$x^2 + 6\,x + 9$$

Soal 5

$$(2x^2 - 3y)^2$$

>$& (expand ((2*x^2-3*y)^2))

$$9\,y^2 - 12\,x^2\,y + 4\,x^4$$

Soal 1

$$t^2 + 8t + 15$$

```
>$& factor (t^2+8*t+15)
```

$$(t+3)\,(t+5)$$

Soal 2

$$y^2 + 12y + 27$$

```
>$& factor (y^2+12*y+27)
```

$$(y+3)\,(y+9)$$

Soal 3

$$8x^2 - 32$$

$$8\,(x-2)\,(x+2)$$

Soal 4

$$4y^2 - 5$$

$$4\,y^2 - 5$$

Soal 5

$$m^2 - 9n^2$$

```
>$& factor (m^2-9*n^2)
```

$$(m - 3\,n)\,(3\,n + m)$$

Soal 1

$$x^2 + 5x = 0$$

```
>$& solve (x^2+5*x=0)
```

$$[x = -5, x = 0]$$

Soal 2

$$y^2 + 6y + 9 = 0$$

```
>$& solve (y^2+6*y+9=0)
```

$$[y = -3]$$

Soal 3

$$12z^2 + z = 6$$

>$& solve (12*z^2+z=6)

$$\left[z = -\frac{3}{4}, z = \frac{2}{3}\right]$$

Soal 4

$$z^2 = 144$$

>$& solve (z^2=144)

$$[z = -12, z = 12]$$

Soal 5

$$t^2 = 25$$

```
>$& solve (t^2=25)
```

$$[t = -5, t = 5]$$

Soal 1

$$\frac{x^2 - 4}{x^2 - 4x + 4}$$

```
>$& factor ((x^2-4)/(x^2-4*x+4))
```

$$\frac{x + 2}{x - 2}$$

Soal 2

$$\frac{x^3 - 6x^2 + 9x}{x^3 - 3x^2}$$

```
>$& factor ((x^3-6*x^2+9*x)/(x^3-3*x^2))
```

$$\frac{x - 3}{x}$$

Soal 3

$$\frac{4 - x}{x^2 + 4x - 32}$$

```
>$& factor ((4-x)/(x^2+4*x-32))
```

$$-\frac{1}{x + 8}$$

Soal 4

$$\frac{6 - x}{x^2 - 36}$$

```
>$& factor ((6-x)/(x^2-36))
```

$$-\frac{1}{x + 6}$$

Soal 5

$$\frac{7}{5x} + \frac{3}{5x}$$

```
>$& factor ((7/5*x)+(3/5*x))
```

$$2\,x$$

Soal 1

$$(x^n + 10)(x^n - 4)$$

```
>$& showev ('expand((x^n+10)*(x^n-4)))
```

$$expand\left((x^n - 4)\,(x^n + 10)\right) = x^{2\,n} + 6\,x^n - 40$$

Soal 2

$$(y^b - z^c)(y^b + z^c)$$

```
>$& showev ('expand((y^b-z^c)*(y^b+z^c)))
```

$$expand\left(\left(y^b - z^c\right)\,\left(z^c + y^b\right)\right) = y^{2\,b} - z^{2\,c}$$

Soal 3

$$(a^n - b^n)^3$$

>$& (expand((a^n-b^n)^3))

$$-b^{3n} + 3a^n b^{2n} - 3a^{2n} b^n + a^{3n}$$

Soal 4

$$m^6 n - m^3 n$$

>$& factor (m^6*n-m^3*n)

$$(m-1) m^3 (m^2 + m + 1) n$$

Soal 5

$$x^2 t - 3x^t - 28$$

>$& factor (x^2*t-3*x^t-28)

$$-3\,x^t + t\,x^2 - 28$$

Diketahui f(x)= 3x+1, g(x)=x^2-2x-6, dan h(x)=x^3, carilah masing-masing dari berikut.
Soal 1

$$(fog)(-1)$$

```
>$& (3*(x^2-2*x-6)+1) with x=-1
```

$$-8$$

Soal 2

$$(hof)(1)$$

```
>$& (3*x+1)^3 with x=1
```

64

Soal 3

$$(foh)(-3)$$

```
>$& 3*(x^3)+1 with x=-3
```

$$-80$$

Soal 4

$$(gof)(-2)$$

```
>$& (3*x+1)^2-2*(3*x+1)-6 with x=-2
```

29

$$(hog)(3)$$

```
>$& (x^2-2*x-6)^3 with x=3
```

$$-27$$

Soal 1

$$(-5 + 3i) + (7 + 8i)$$

```
>$& (-5+3*i)+(7+8*i)
```

$$11\,i + 2$$

Soal 2

$$(-6 + 5i) + (9 + 2i)$$

```
>$& (-6+5*i)+(9+2*i)
```

$$7\,i + 3$$

Soal 3

$$(7 - 2i) + (4 - 5i)$$

```
>$& (7-2*i)+(4-5*i)
```

$$11 - 7\,i$$

Soal 4

$$(-5 - i) + (6 + 2i)$$

```
>$& (-5-i)+(6+2*i)
```

$$i + 1$$

Soal 5

$$(12 + 3i) + (-8 + 5i)$$

```
>$& (12+3*i)+(-8+5*i)
```

$$8\,i + 4$$

Soal 6

$$(-1 - i) + (-3 - i)$$

```
>$& (-1-i)+(-3-i)
```

$$-2\,i - 4$$

Soal 7

$$(-3 - 4i) - (8 - i)$$

>$& (-3-4*i)-(8-i)

$$-3\,i - 11$$

Soal 8

$$(13 + 9i) - (8 + 2i)$$

>$& (13+9*i)-(8+2*i)

$$7\,i + 5$$

Soal 1

$$x^2 - 2x = 15$$

```
>$& solve (x^2-2*x=15)
```

$$[x = -3, x = 5]$$

Soal 2

$$3x^2 + 6 = 10x$$

```
>$& solve (3*x^2+6=10*x)
```

$$\left[x = \frac{5 - \sqrt{7}}{3}, x = \frac{\sqrt{7} + 5}{3} \right]$$

Soal 3

$$x^2 + 4x = 5$$

```
>$& solve (x^2+4*x=5)
```

$$[x = -5, x = 1]$$

Soal 4

$$2t^2 - 5t = 1$$

```
>$& solve (2*t^2-5*t=1)
```

$$\left[t = \frac{5 - \sqrt{33}}{4}, t = \frac{\sqrt{33} + 5}{4} \right]$$

Soal 5

$$3t^2 + 8t + 3 = 0$$

>$& solve (3*t^2+8*t+3=0)

$$\left[t = \frac{-\sqrt{7} - 4}{3}, t = \frac{\sqrt{7} - 4}{3} \right]$$

Soal 6

$$y^4 - 15y - 16 = 0$$

>$& solve (y^4-15*y-16=0)

$$\left[y = -\frac{2 \left(\frac{\sqrt{3} i}{2} - \frac{1}{2} \right)}{9 \left(\frac{\sqrt{6691}}{2\,3^{\frac{3}{2}}} + \frac{425}{54} \right)^{\frac{1}{3}}} + \left(\frac{\sqrt{6691}}{2\,3^{\frac{3}{2}}} + \frac{425}{54} \right)^{\frac{1}{3}} \left(-\frac{\sqrt{3} i}{2} - \frac{1}{2} \right) + \frac{1}{3}, y = \left(\frac{\sqrt{6691}}{2\,3^{\frac{3}{2}}} + \frac{425}{54} \right)^{\frac{1}{3}} \left(\frac{\sqrt{3} i}{2} - \frac{1}{2} \right) - \frac{2 \left(-\frac{\sqrt{3} i}{2} \right.}{9 \left(\frac{\sqrt{6691}}{2\,3^{\frac{3}{2}}} + \right.}$$

Soal 1

$$(3 - 2i) + (-4 + 3i)$$

```
>$& (3-2*i)+(-4+3*i)
```

$$i - 1$$

Soal 2

$$(-5 + i) - (2 - 4i)$$

```
>$& (-5+i)-(2-4*i)
```

$$5\,i - 7$$

Soal 3

$$4x^2 = 24$$

$$\left[x = -\sqrt{6}, x = \sqrt{6}\right]$$

Soal 4

$$x^2 + 100 = 0$$

$$[x = -10\,i, x = 10\,i]$$

Soal 5

$$x^4 + 5x^2 - 6 = 0$$

```
>$& solve (x^4+5*x^2-6=0)
```

$$\left[x = -1, x = 1, x = -\sqrt{6}\,i, x = \sqrt{6}\,i \right]$$

Soal 1

$$\frac{1}{4} + \frac{1}{5} = \frac{1}{t}$$

>$& solve (1/4+1/5=1/t)

$$\left[t = \frac{20}{9} \right]$$

Soal 2

$$\frac{1}{3} - \frac{5}{6} = \frac{1}{x}$$

>$& solve (1/3-5/6=1/x)

$$[x = -2]$$

Soal 3

$$\frac{x+2}{4} - \frac{x-1}{5} = 15$$

>$& solve ((x+2)/4-(x-1)/5=15)

$$[x = 286]$$

Soal 4

$$\frac{t+1}{3} - \frac{t-1}{2} = 1$$

>$& solve ((t+1)/3-(t-1)/2=1)

$$[t = -1]$$

Soal 5

$$x - \frac{12}{x} = 1$$

>$& solve (x-12/x=1)

$$[x = -3, x = 4]$$

Soal 1

$$|x + 3| - 2 = 8$$

```
>$& solve (abs(x+3)-2=8)
```

$$[|x + 3| = 10]$$

Soal 2

$$|3x + 1| - 4 = -1$$

```
>$& solve(abs(3*x+1)-4=-1)
```

$$[|3\,x + 1| = 3]$$

Soal 3

$$12 - |x + 6| = 5$$

```
>$& solve (12-abs(x+6)=5)
```

$$[|x + 6| = 7]$$

Soal 4

$$|x - 4| + 3 = 9$$

```
>$& solve (abs(x-4)+3=9)
```

$$[|x - 4| = 6]$$

Soal 5

$$|2x - 1| - 5 = -3$$

```
>$& solve (abs(2*x-1)-5=-3)
```

$$[|2\,x - 1| = 2]$$

Soal 1

$$\frac{3}{3x+4} + \frac{2}{x-1} = 2$$

```
>$& solve (3/(3*x+4)+2/(x-1)=2)
```

$$\left[x = \frac{13}{6}, x = -1\right]$$

Soal 2

$$\sqrt{x+4} - 2 = 1$$

```
>$& solve (sqrt(x+4)-2=1)
```

$$[x = 5]$$

Soal 3

$$\sqrt{x+4} - \sqrt{x-4} = 2$$

>$& solve (sqrt(x+4)-sqrt(x-4)=2)

$$\left[\sqrt{x+4} = \sqrt{x-4} + 2\right]$$

Soal 4

$$|x+4| = 7$$

>$& solve (abs(x+4)=7)

$$[|x+4| = 7]$$

Soal 5

$$x + 5\sqrt{x} - 36 = 0$$

>$& solve (x+5*sqrt(x)-36=0)

$$\left[x = 36 - 5\sqrt{x} \right]$$

Temukan fungsi polinomial
Soal 1

$$f(x) = (x^2 - 5x + 6)^2$$

```
>$&factor (x^2-5*x+6)^2
```

$$(x - 3)^2 (x - 2)^2$$

Soal 2

$$f(x) = x^4 - 4x^2 + 3$$

```
>$& factor (x^4-4*x^2+3)
```

$$(x - 1)(x + 1)(x^2 - 3)$$

Soal 3

$$f(x) = x^4 - 10x^2 + 9$$

```
>$& factor (x^4-10*x^2+9)
```

$$(x - 3)\,(x - 1)\,(x + 1)\,(x + 3)$$

Soal 4

$$f(x) = 3x^3 + x^2 - 48x - 16$$

```
>$& factor (3*x^3+x^2-48*x-16)
```

$$(x - 4)\,(x + 4)\,(3\,x + 1)$$

Soal 5

$$f(x) = 2x^3 - x^2 - 8x + 4$$

```
>$& factor (2*x^3-x^2-8*x+4)
```

$$(x - 2)\,(x + 2)\,(2\,x - 1)$$

Faktorkan fungsi polinomialnya
Soal 1

$$f(x) = x^3 + 4x^2 + x - 6$$

```
>$&factor (x^3+4*x^2+x-6)
```

$$(x - 1)(x + 2)(x + 3)$$

Soal 2

$$f(x) = x^3 + 5x^2 - 2x - 24$$

```
>$& factor (x^3+5*x^2-2*x-24)
```

$$(x - 2)(x + 3)(x + 4)$$

Soal 3

$$f(x) = x^3 - 6x^2 + 3x + 10$$

```
>$& factor (x^3-6*x^2+3*x+10)
```

$$(x - 5)\,(x - 2)\,(x + 1)$$

Soal 4

$$f(x) = x^4 + 11x^3 + 41x^2 + 61x + 30$$

```
>$& factor (x^4+11*x^3+41*x^2+61*x+30)
```

$$(x + 1)\,(x + 2)\,(x + 3)\,(x + 5)$$

Soal 5

$$f(x) = x^4 - 7x^3 + 9x^2 + 27x - 54$$

>$&factor (x^4-7*x^3+9*x^2+27*x-54)

$$(x-3)^3 (x+2)$$

Soal 1

$$\frac{3x^4 - x^3 + 2x^2 - 6x + 6}{x - 2}$$

```
>$& factor ((3*x^4-x^3+2*x^2-6*x+6)/(x-2))
```

$$\frac{3\,x^4 - x^3 + 2\,x^2 - 6\,x + 6}{x - 2}$$

Soal 2

$$\frac{x^5 - 5}{x + 1}$$

```
>$& factor (x^5-5)/(x+1)
```

$$\frac{x^5 - 5}{x + 1}$$

Soal 3

$$g(x) = x^3 - 9x^2 + 4x - 10,$$

temukan: g(-5)

```
>function g(x):= x^3-9*x^2+4*x-10
>g(-5)
```

  -380

Soal 4

$$f(x) = 5x^4 + x^3 - x$$

Temukan

$$f(-\sqrt{2})$$

```
>function f(x):=5*x^4+x^3-x
>f(-sqrt(2))
```

  18.5857864376

Soal 5

$$f(x)20x^2 - 40x$$

Temukan,

$$f(\frac{1}{2})$$

```
>function f(x):=20*x^2-40*x
>f(1/2)
```

   -15

Soal 6

$$h(x) = x^3 - 2x^2 - 55x + 56$$

```
>$& factor (x^3-2*x^2-55*x+56)
```

$$(x - 8)\,(x - 1)\,(x + 7)$$

Soal 7

$$g(x) = x^4 - 2x^3 - 13x^2 + 14x + 24$$

```
>$& factor (x^4-2*x^3-13*x^2+14*x+24)
```

$$(x - 4)\,(x - 2)\,(x + 1)\,(x + 3)$$